

Sustainability is Survivability.



Construction and Sustainability Consultants

Climate Change, Healthcare and Carbon Footprints Conference

Carbon Down: The Financial Benefit of Sustainable Design Initiatives for The Healthcare Facility



Presented 5th August; 2010

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Vim Sustainability-who are we?

- Est 2003
- ❑ We are specialist sustainability consultants and engineers
- ❑ ESD Consultants on the World's first Zero Emissions Development (ZED) Standard Healthcare Communities-Sydney and Canberra
- ❑ We specialise in the following for the built environment:-
- ❑ Sustainable design science
- ❑ Local climate analysis, sustainable design strategies, thermal mass analysis, natural ventilation design, daylighting analysis, renewable energy design
- ❑ Passive and low tech heating and cooling engineered solutions
- ❑ Educational workshops and presentations
- ❑ Sustainable business operations analysis, diagnostics and policy
- ❑ Energy and eco auditors -accredited DECCW (NSW)
- ❑ Appointed ESD Consultants NSW Health ;ACT Government
- ❑ Building energy, CFD and thermal software modelling diagnostics
- ❑ New or refurbished buildings
- ❑ Innovative yet practical and cost effective
- ❑ We work personally with you

Energy Analysis

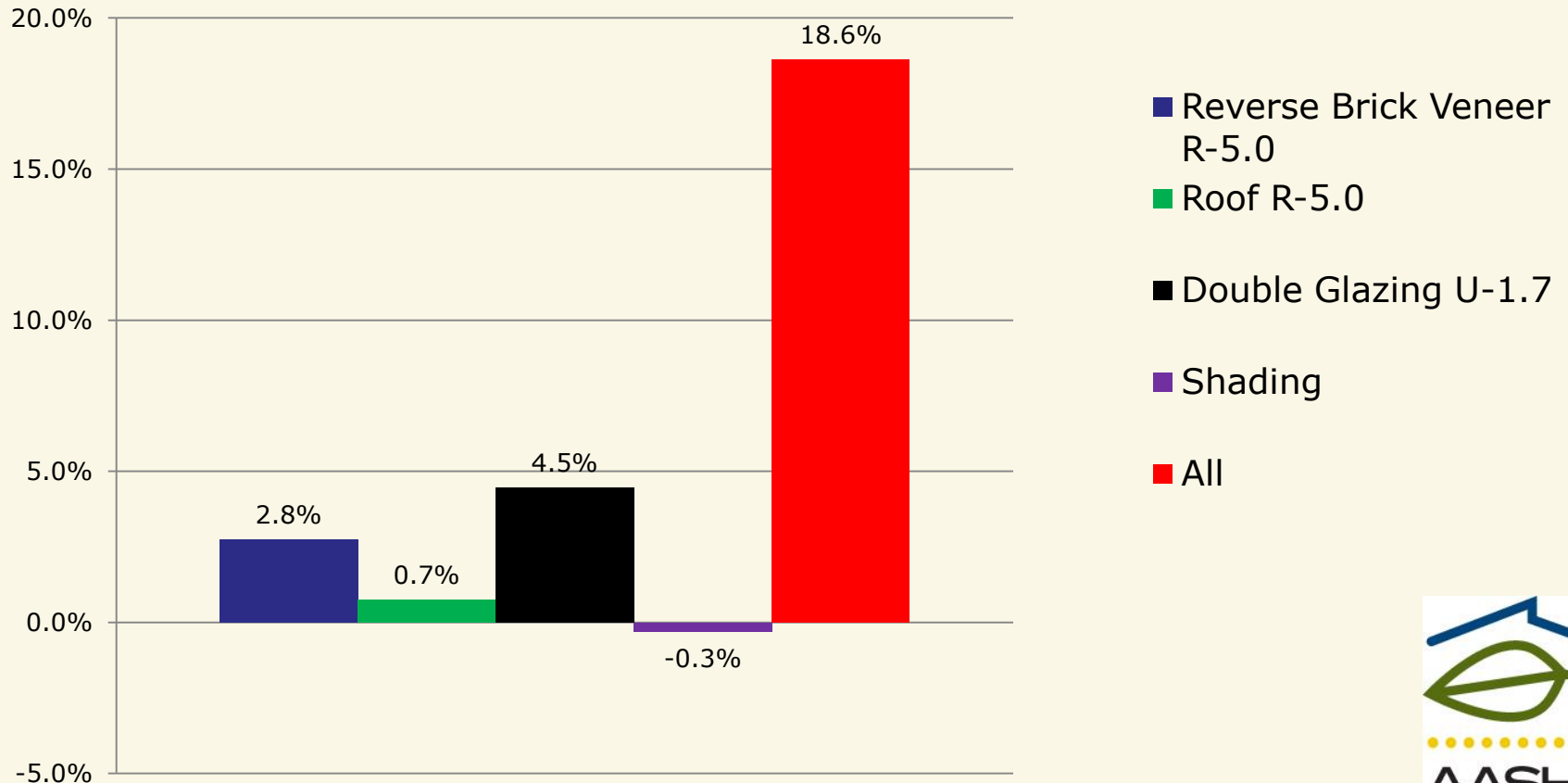
100 bed aged care facility

Spend \$1.8 million extra on an \$18 million dollar building.



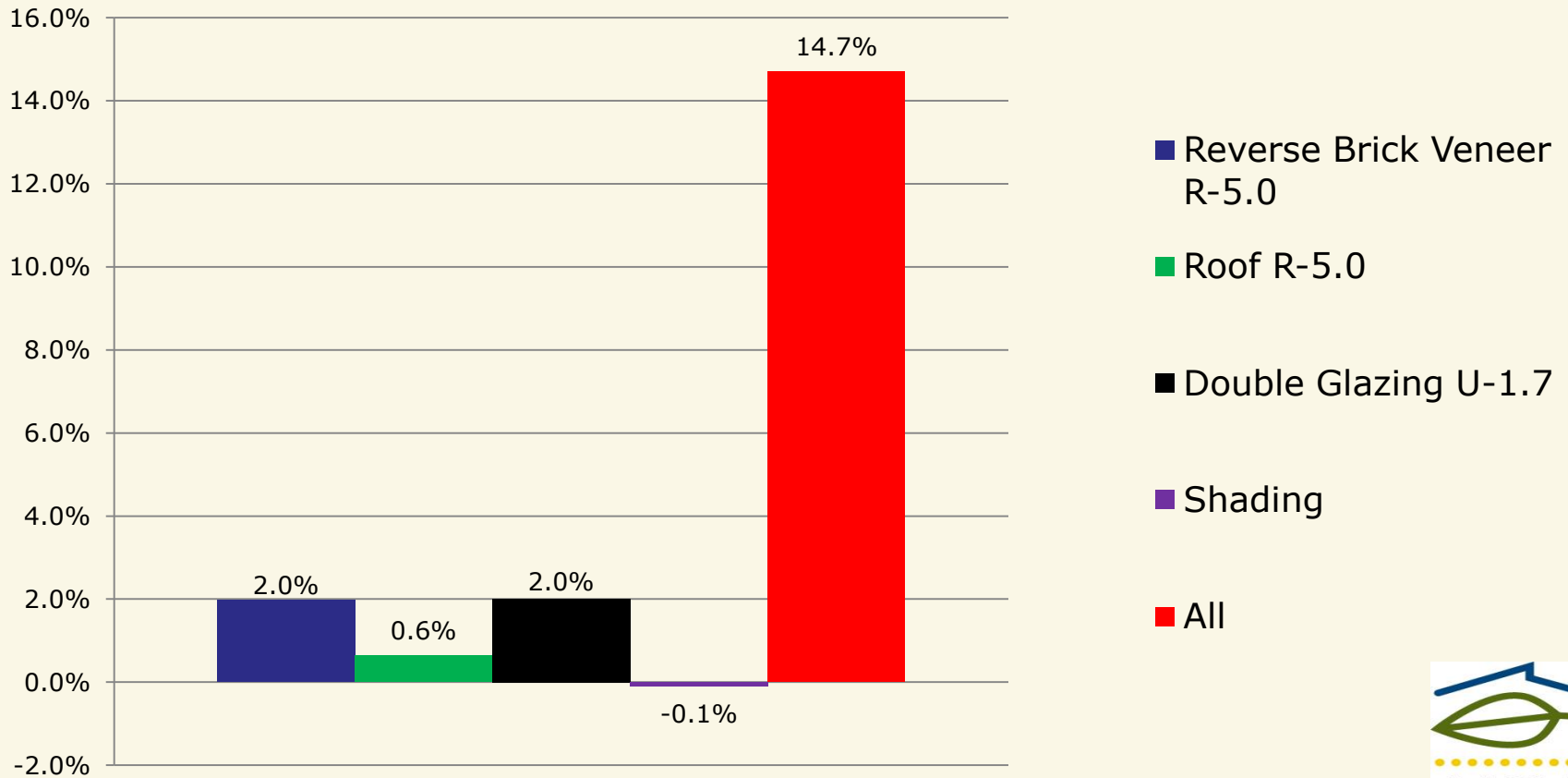
Melbourne

Percentage energy improvement over DTS solution



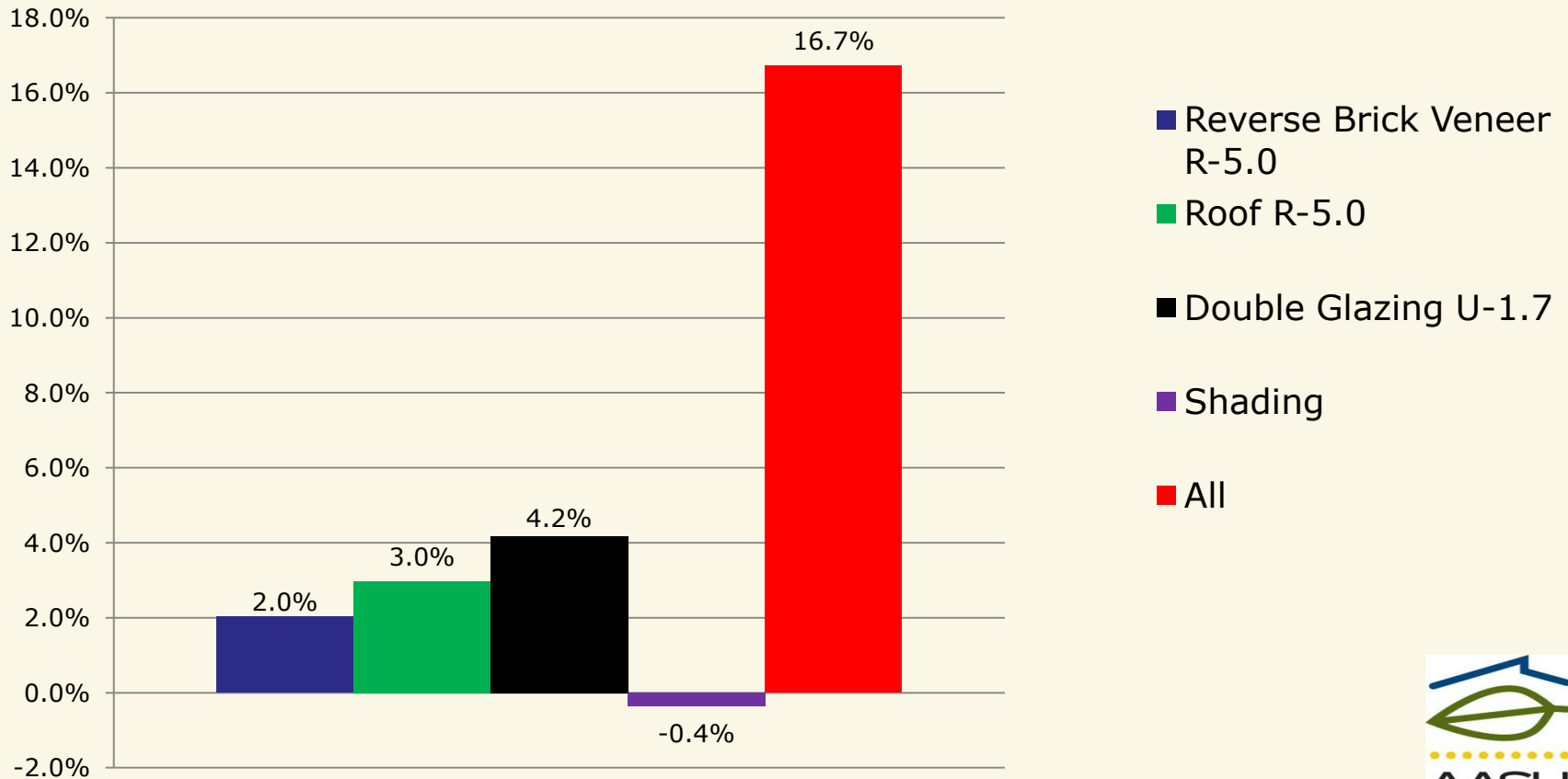
Sydney

Percentage energy improvement over DTS solution



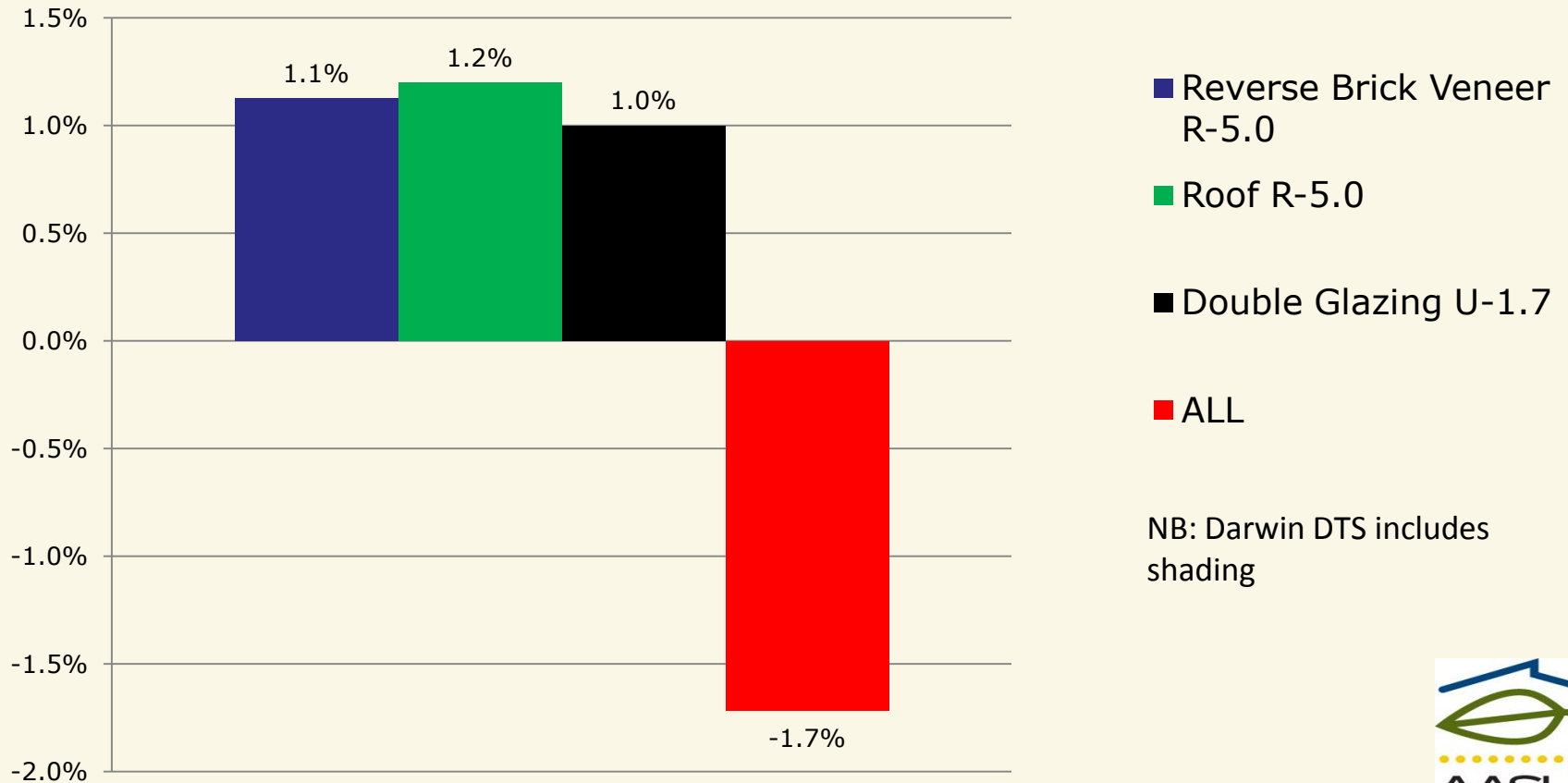
Canberra

Percentage energy improvement over DTS solution



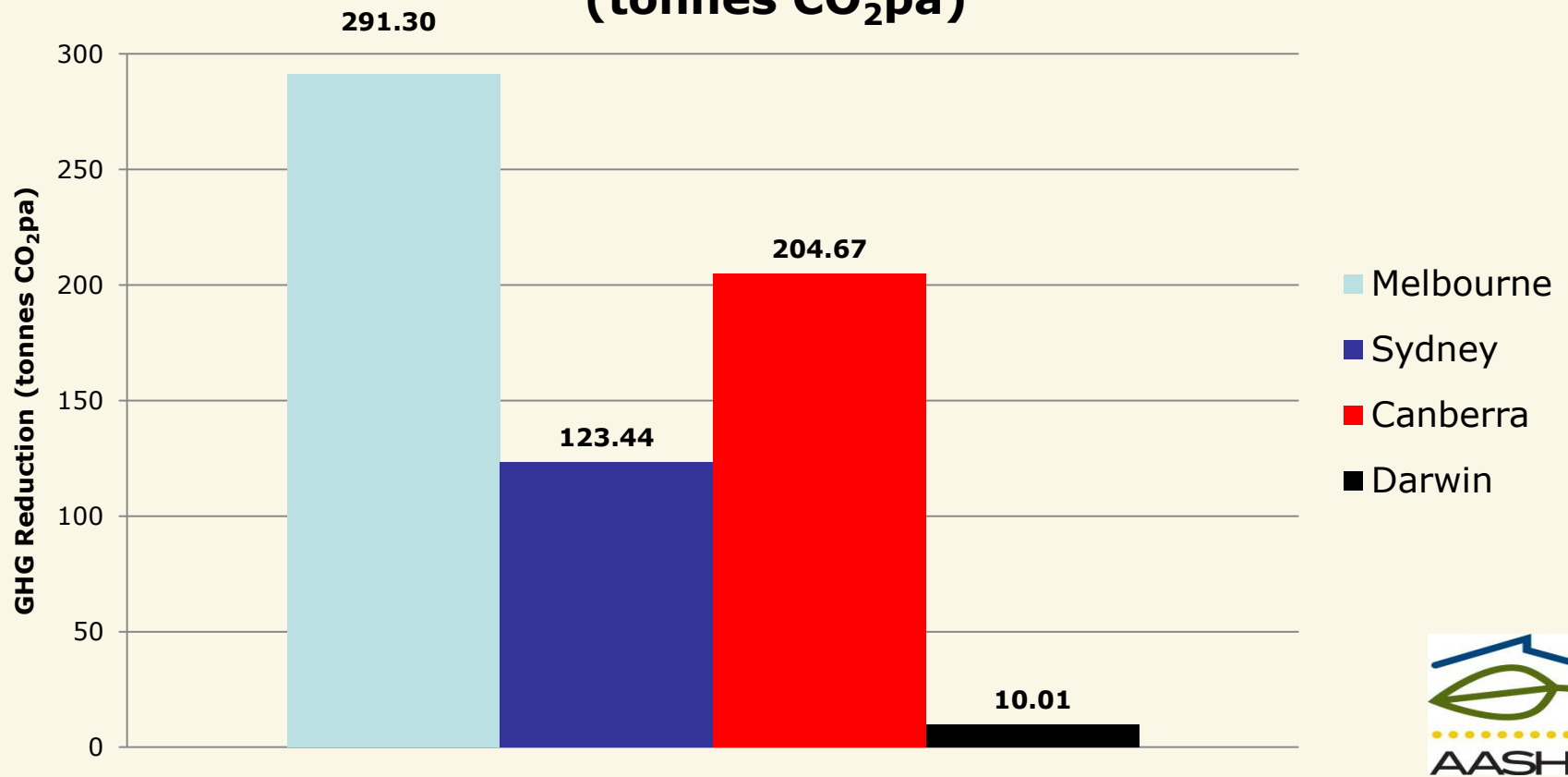
Darwin

Percentage energy improvement over DTS solution



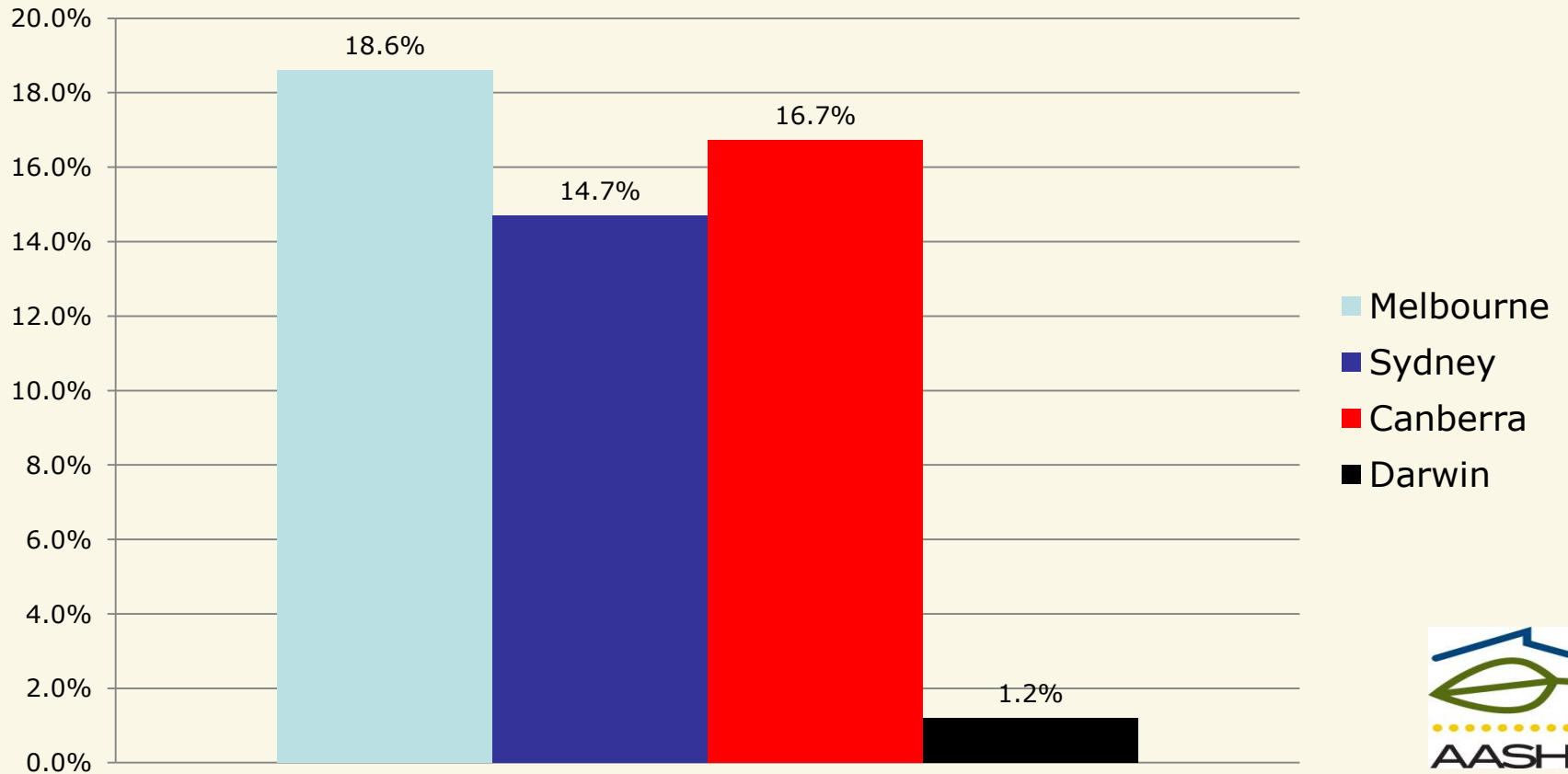
Annual Greenhouse Gas Reductions

Greenhouse Gas Reduction (tonnes CO₂pa)



Optimised Model

Improvement in energy use over DTS



Annual Greenhouse Gas Emissions

	Melbourne	Sydney	Canberra	Darwin
DTS (MJ/m²pa)	730.14	543.50	791.99	706.41
Optimised (MJ/m²pa)	594.26	463.63	659.56	698.14
GHG reduction (tonnes CO₂pa)	291.30	123.44	204.67	10.01

Payback Period @5% yearly increase

- Assume **\$1m** (10%) extra over costs for environmentally sustainable initiatives
- Electricity cost 12c/kWh increasing at 5% pa

	Payback Period*	Saving over DTS		Energy Savings Year 1	Energy Savings Year 10
		GJ/year	kWh/year		
Melbourne	19 years	846.8	235,222.2	\$ 33,307	\$ 51,671
Sydney	26 years	497.6	138,222.2	\$ 19,572	\$ 30,363
Canberra	20 years	825.28	229,244.4	\$ 32,461	\$ 50,358
Darwin	66 years	52.97	14,713.9	\$ 2,083	\$ 3,232

*Payback period based on optimum energy efficiency initiatives

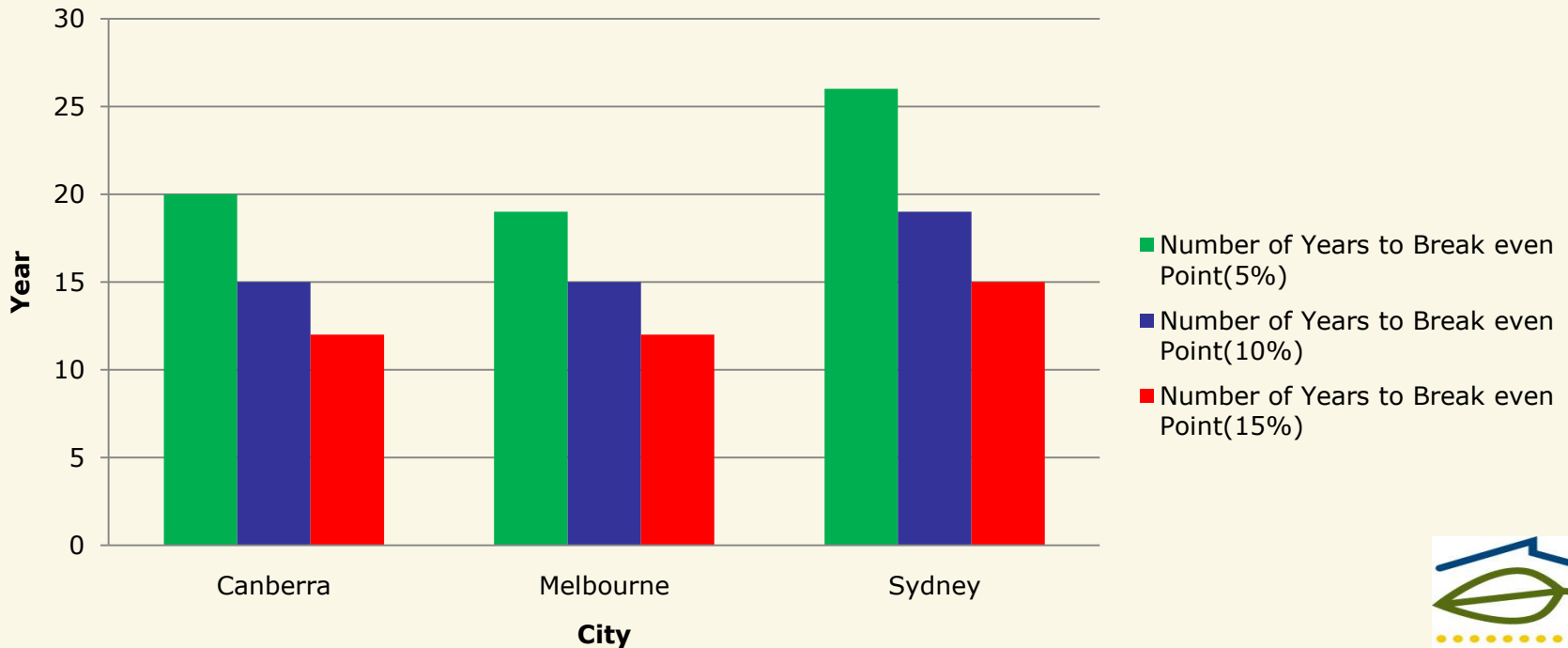
Power cost\$

- If your power bill is \$118,000 year now and it goes up by 5% year compound, in 20 years it will be worth \$299,566 per year!
- If your power bill is \$129,000 /year and goes up by compound 15% per year compound, in 20 years it will be worth **\$1,847,836.63** p/a!
- If your power bill is \$110,000 per year due to energy savings you are saving \$19,000 in the first year in running costs.
- In 20 years time you will be saving \$271,000 p/a.!..... over your initial DTS building.
- (Note: no Feed in tariffs considered)



The more you save initially the greater the savings eventually

Break even point



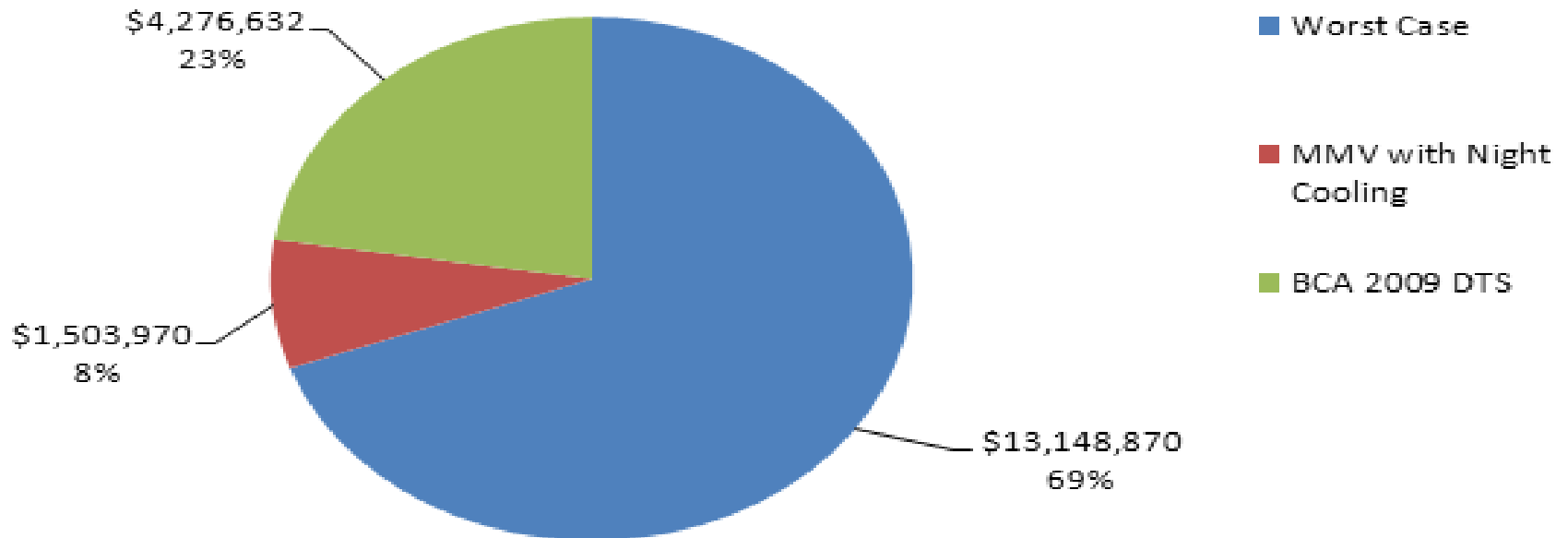
A large power using facility

• 5,000 sq metres

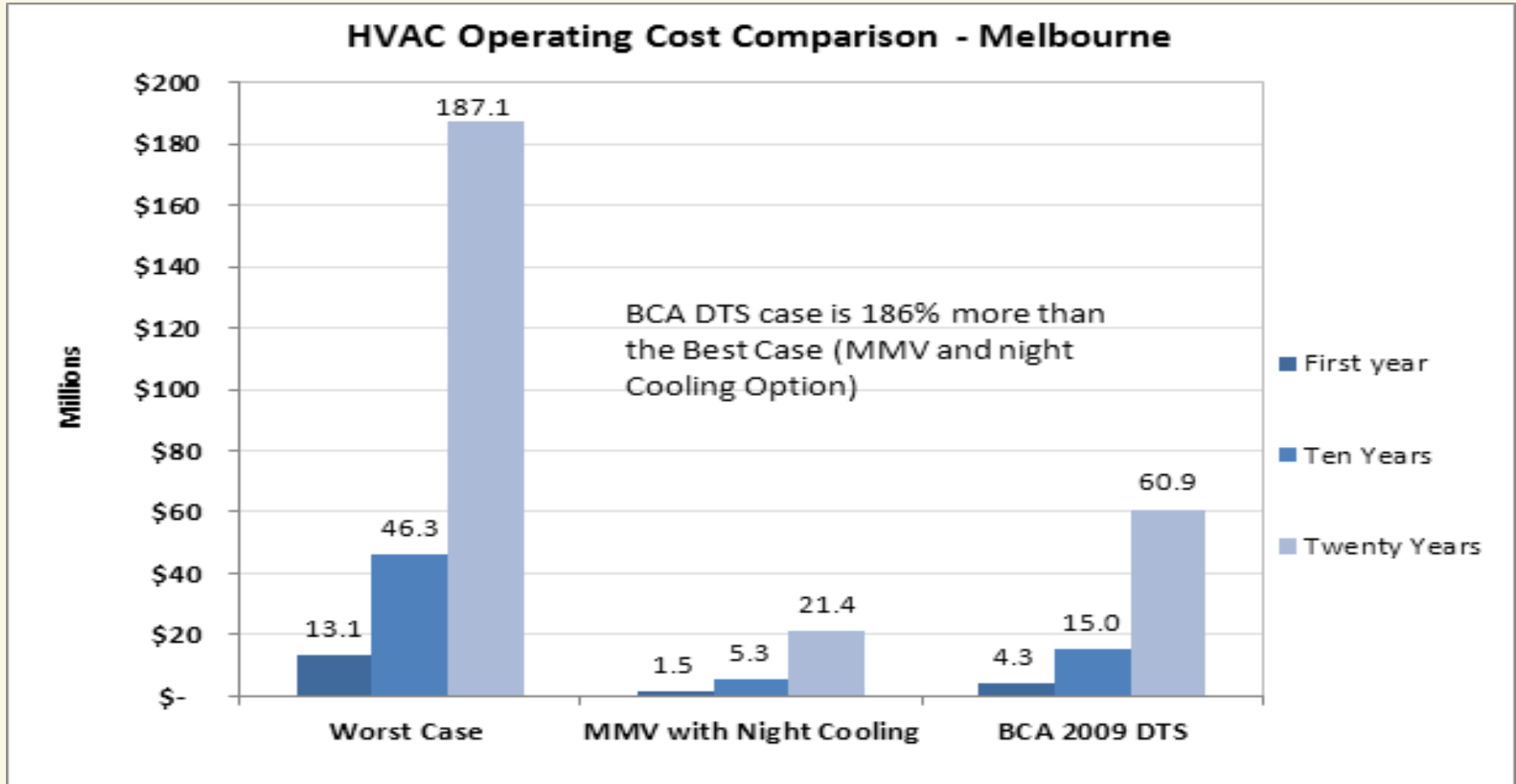
- DTS Section J 2009 design for Melbourne
- Increased roof and wall insulation to R6 and R5
- Implemented night purging and a mixed mode system
- Control temp 20-24 Deg C
- Also ran a worst case scenario

Major Project Sustainability Value

Comparison of First Year HVAC Operating Cost



HVAC cost improvements by using nature !



Site Information

- Nature of the business : Retail
- Location : Victoria
- Gross area : 8452 m²
- Number of employees at any time: 24
- Operating hours : 24/7 basis
- Annual energy consumption: 2159 MWh
- Annual gas consumption : 726 GJ
- Lighting energy in sun pipe applying area : 1132 MWh

Cost Benefit Indicators

Description of Indicators	Amount
Estimated Investment	\$223,537.00
Estimated annual saving ¹	\$58,487.00
Project payback period	3.82 years
Annual predicted energy saving	261 MWh
Annual greenhouse gas saving	360 tCO ₂

1 – Saving is calculated as weighted saving over four years period

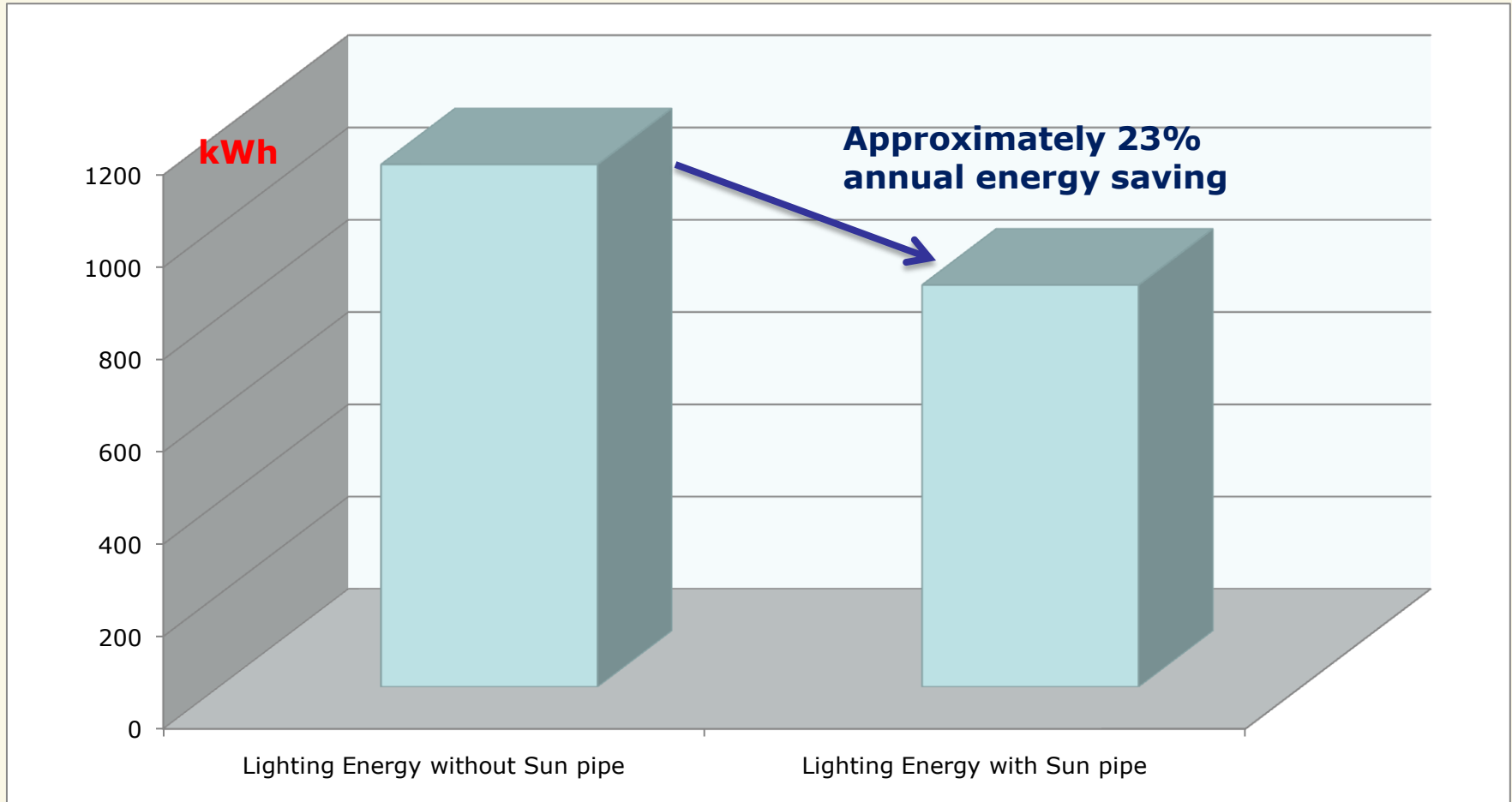
Payback Analysis for 10 Years Period

	Without sun pipes	with sun pipes	Predicted Savings	Cumulative savings
Year 1	\$ 139,640	\$ 89,231	\$ 50,409	\$ 50,409
Year 2	\$ 153,604	\$ 98,154	\$ 55,450	\$ 105,859
Year 3	\$ 168,964	\$ 107,970	\$ 60,995	\$ 166,854
Year 4	\$ 185,861	\$ 118,766	\$ 67,094	\$ 233,948
Year 5	\$ 204,447	\$ 130,643	\$ 73,804	\$ 307,752
Year 6	\$ 224,892	\$ 143,707	\$ 81,184	\$ 388,936
Year 7	\$ 247,381	\$ 158,078	\$ 89,303	\$ 478,239
Year 8	\$ 272,119	\$ 173,886	\$ 98,233	\$ 576,472
Year 9	\$ 299,331	\$ 191,275	\$ 108,056	\$ 684,528
Year 10	\$ 329,264	\$ 210,402	\$ 118,862	803,390

←
Project Payback

←
Cumulative saving at the end of 10 years

Graphical Interpretation



Remember

Carbon Down



- Profit Up \$

